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THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY, DIVISION OF MYCOLOGY AND DISEASE SURVEY
BUREAU OF PLANT INDUSTRY, AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXVI November 15, 1942 Number 21

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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FRUIT AND VEGETABLE DISEASES ON THE CHICAGO MARKET IN 1940 AND 1941

G. B. Ramsey

APPLE:

Alternaria rot (Alternaria sp.) is often found on the market in the calyx end of fruit injured by chemicals used in spraying or washing. In 1940 a few lots of Jonathan apples from Washington State showed as high as 10% of this rot following calyx injury.

Bitter pit (physiological). The Gravenstein variety of apples is particularly susceptible to this trouble. Large sizes often show 3 to 4 times as much injury as small fruit. In 1940 Oregon-grown Gravensteins marketed during August sometimes showed 15% bitter pit in the large sizes. During August 1941 Gravensteins from California showed a range of 4 to 35%. Bitter pit was found in Greenings from New York in December, 1941, ranging from 5 to 25%.

Blue mold (Penicillium sp.) was found to some extent in apples from all regions. The higher percentages of decay were usually found in storage apples marketed during late winter and early spring. The highest amount (13%) of blue mold rot was noted in a car of Washington-grown Winesap apples inspected in May, 1940. Idaho-grown Delicious showing calyx injury had 10% blue mold in lots marketed during October.

Chemical injury. Each year occasional lots of apples show some injury caused by chemicals used in spraying or in washing solutions. Calyx injury caused by arsenical burn is most common, but the most conspicuous injury is a brown surface discoloration, frequently involving the whole apple, caused by hot washing solutions. Occasionally as much as 55% of the apples in some boxes are found discolored. However, accidental injuries of this type are rare.

Internal breakdown was of little importance in most of the apples inspected here during 1940 and 1941. The greatest amount of this trouble (25%) was found in a car of Washington apples marketed in March, 1941.

Jonathan Spot. One car of Jonathan apples from Washington marketed in October, 1940 showed a range of 4 to 16%, averaging 7%. In 1941 many Michigan-grown Jonathans marketed in October showed spotting ranging from 5 to 20%. Some of these apples had from 1/4 to 1/2 of the surface discolored.

Rhizopus rot (R. nigricans) is comparatively rare on the market, but occasionally ripe, bruised apples and worm-damaged fruit show this trouble. One lot of Michigan apples marketed in October, 1941 that showed 3% worm damage had 4% of rhizopus rot.

Sporotrichium rot (Sporotrichium sp.). Each year a few lots of apples from Washington and Oregon show traces of this decay. Frequently it is associated with infections by Gloeosporium and Fusarium.

ARTICHOKE (GLOBE):

Gray mold rot (Botrytis sp.) is so far the only market disease of California artichokes that is of economic importance. Small percentages

of this disease occur commonly, but now and then a few boxes may be found showing excessive decay. Delayed shipments or stock held a week or two on the market often show serious decay. In 1941 one lot on inspection showed a range from 20 to 85%, with an average of 45%.

ASPARAGUS:

Bacterial soft rot (Bacterium sp.) affects California asparagus to some extent each year. Usually the tips and cut ends of the shoots are affected. Five to 10% of this decay is not uncommon and occasionally as much as 25% is found. The shipments that are properly precooled seldom develop much of this rot during transit.

Gray mold rot (Botrytis sp.) is not often found on asparagus but occasionally it causes some trouble, such as was found in a car of California stock inspected in March, 1941, showing 20% decay.

Phytophthora rot (Phytophthora sp.). California asparagus received during March and April, 1940 and 1941, showed phytophthora rot affecting as much as 25% in some lots. The infections take place at the soil line and lesions average about 2 inches in length by the time stock reaches the market.

AVOCADO:

Anthracnose (Colletotrichum gloeosporioides) was especially serious in a lot of California fruit inspected in a store in March, 1941. In some boxes the decay ranged to 60%, and the average for the lot was 24%.

Surface rot (Dothorichella gregaria) was found in several lots of California fruit during 1940 and 1941, from December to May. The most extensive decay, 45%, found was in a lot inspected in a store. This spot and rot has been much more prevalent during the last 2 years than in previous seasons. Most lesions are small and superficial on arrival of shipments. Serious development of surface and internal decay occurs while the fruits are held on the market and in stores for ripening.

ANISE:

Watery soft rot (Sclerotinia sclerotiorum) was found in a car of California anise inspected in February, 1940, the decay ranging from 40 to 100%, averaging about 90%. The bulb-like base of the plant was affected as well as the top.

APRICOT:

Rhizopus soft rot (Rhizopus nigricans) occurred in a car of Washington stock inspected in July, 1940. The average for the lot was about 25% but many boxes of ripe fruit showed 80% of this decay.

BEANS:

Anthracnose (Colletotrichum lindemuthianum) was more serious in Florida beans during 1941 than in the previous year. As is often the case truck

shipments showed most decay. In one instance an average of 65% was found in a truck load marketed in January.

Bacterial blight (Phytomonas [Xanthomonas] phaseoli) was present in some lots of Colorado beans marketed during July 1940, about 7% of the pods being spotted. This disease also was found affecting 5% of some lots of Florida beans in April 1941.

Soil rot (Corticium microsclerotia) affected Louisiana beans marketed in October and November of 1940. So far, this disease has not been noted on this market except in Louisiana and Mississippi beans.

Watery soft rot (Sclerotinia sclerotiorum) was found in Florida beans in 1940 from November to April, some lots averaging 10% infection.

BROCCOLI:

Bacterial soft rot (Erwinia carotovora) was the chief parasitic disease affecting California and Arizona broccoli on the market in 1940 and 1941. However, most lots showed small percentages of this decay, the highest range being 10%.

The spreading and opening of the flowers is one of the most important marketing factors. In one lot of Arizona stock marketed in November 70% of the bunches showed about 1/3 of the flowers yellow.

CABBAGE:

Alternaria leaf spot (Alternaria sp.) was particularly evident in both California and Texas cabbage in 1941. Sometimes practically every head showed appreciable blemishing by a multitude of small spots.

Bacterial soft rot (Erwinia carotovora) is frequently serious in cabbage from all regions, but it is particularly damaging in lots that become warm. For example, truck loads from Louisiana and Missouri have shown 45% loss on account of this decay. Generally the amount is less than 10%.

Black leaf speck (physiological) was found affecting 20% of the heads in a car of California stock inspected in February 1940.

Watery soft rot (Sclerotinia sclerotiorum) was noted in 1940 in Texas cabbage marketed in March and in California stock marketed in April. The highest amount was 8%, in a California car.

CANTALOUP:

Cladosporium rot (Cladosporium cucumerinum) is usually most prevalent as a stem-end or slip rot. Surface discoloration by this fungus sometimes detracts from the appearance of melons but generally does not lead to much decay. Colorado and California melons showed small amounts of this mold in 1940.

Fusarium (Fusarium sp.) was the most common cause of decay in melons from California, Arizona, and Colorado, in both 1940 and 1941. Slight spots on the ground side of the melon and infections at the stem end were most common. In few lots inspected were more than 5% of the melons affected. One exceptional lot of Colorado melons marketed in September 1941

was noted. The previous history of this car is not known but evidently some unusual circumstance must have prevailed, since 30% of the melons showed Fusarium rot in various stages.

CARROTS:

Bacterial soft rot (Erwinia carotovora). The worst decay from this cause noted in recent years was in a car of New York carrots marketed in October 1941. In the top layer of crates the roots were firm and the tops green and showed only 2% soft rot, but the roots and tops in the other layers showed about 50% decay. The effects of heating on the development of this decay is shown by the fact that the temperature was 50° in the top layer while the middle layer half way back to the bunker showed a temperature of 105°.

One lot of California stock marketed in September 1941 showed a range of from 50 to 85% soft rot in the tops and 25% in the roots. This car had a temperature of 70° on arrival.

Watery soft rot (Sclerotinia sclerotiorum) was found in Texas carrots in February, sometimes ranging to 10%, and in California stock in September 1941 ranging to 25% in a few lots.

CAULIFLOWER:

Bacterial soft rot (Erwinia carotovora) is the principal disease of cauliflower on the market. It is more or less prevalent in stock from all districts and is particularly damaging in heads that show bruising. Infections ranging from 3 to 25% were noted in stock from California, Colorado, Oregon, Washington, and New York during 1940 and 1941.

Spreading and discoloration of heads were important marketing factors in many lots.

An unusual browning of heads in a load of Michigan cauliflower in 1941 suggested the possibility that boron deficiency was responsible for this discoloration.

CELERY:

Bacterial soft rot (Erwinia carotovora), as usual, was the chief cause of decay in celery from all regions. Most cars of celery showed slight traces and occasionally the decay ranged up to 20% on arrival, and to 40% after the celery was held in stores for a few days.

Early blight (Cercospora apii) was found in small amounts in several cars but generally it was of no market significance. The most serious trouble of this kind was found in a car of Florida stock marketed in March in which 20% of the leaves were badly spotted.

Late blight (Septoria sp.) was prevalent in California celery marketed during the winter and spring of both 1940 and 1941. Many cars showed an average of around 15% and a few lots in March 1941 showed from 30 to 90% of the bunches affected, the average being 35%. Both leaves and stalks were affected in these lots. A car of Washington celery inspected in November 1940 showed 100% infection, with conspicuous lesions on leaves and stalks.

Watery soft rot (Sclerotinia sclerotiorum) ranged from 3 to 10% in California and Florida stock shipped in 1940 and 1941.

CUCUMBER:

Bacterial spot (Phytomonas [Pseudomonas] lachrymans). This blemish and decay was found in several lots of Florida cucumbers marketed in May and June of 1940. In most lots the range was from 3 to 15% with an average of approximately 8%. This decay was also noted affecting 3 to 4% of some lots of North Carolina and Alabama cucumbers marketed in 1941.

Cottony leak (Pythium aphanidermatum) is rarely seen except in occasional lots of North and South Carolina cucumbers marketed in June. In 1941, this disease occurred in a few car lots, ranging from 2 to 4%.

Green mold rot (Cladosporium cucumerinum) is generally of little consequence during the ordinary transit and marketing period, but in delayed shipments or in stock held on the market for some time the small blemishes and decay spots become of some importance. In a lot of New York cucumbers inspected in a store in September 1940 86 bushel baskets showed serious damage by this disease.

Such defects as shriveling of the ends and yellowish discoloration are often the most important marketing factors.

EGGPLANT:

Fruit rot (Phomopsis vexans). Traces were found in many shipments from Florida. The most serious decay was in a car of Florida eggplants marketed in November 1941, in which a range of 10 to 50% (average 34%) of the fruit showed this rot.

GRAPES:

Blue mold rot (Penicillium sp.) affected the stems and crushed berries in 4 cars of California grapes marketed in January 1941, and caused some depreciation in the market value although the average infection was only 2%.

Gray mold rot (Botrytis sp.) is usually the most active decay found in table grapes on this market. In most instances the range is from 2 to 6%. In rare instances, however, 50% of the stock may be infected, as was the case with a car of California Muscats inspected in September 1940.

Rhizopus rot (Rhizopus sp.) is often serious when the berries are fully ripe and show excessive bruising. One lot of New York grapes inspected in November 1940 had 60% of the bunches affected.

GRAPEFRUIT:

Blue mold rot (Penicillium italicum) was observed during February, March, and April, 1940 and 1941, ranging from 2 to 6% in many cars of Texas grapefruit. Florida stock had little of this decay but an occasional lot ranged up to 2%. In California stock marketed in July and August some cars showed from 2 to 10%, generally averaging around 3%.

Stem end rot (Phomopsis citri). Texas stock inspected in October and November 1941 often showed this disease in amounts from 2 to 13%, the average for most of the cars inspected being about 4%.

LEMON:

Alternaria rot (Alternaria sp.). Relatively little of this decay has been observed in recent years. A lot of California lemons inspected in November 1940 had an appreciable amount of Alternaria infection causing button and center rots.

Blue and green mold rots (Penicillium sp.) were noted in several lots of California lemons marketed from January to May, 1940 and 1941. While most carlots had only traces, occasionally some showed from 2 to 22%, averaging 10%.

LETTUCE:

Bacterial soft rot (Erwinia carotovora) occurs to some extent in practically all shipments of lettuce. Well trimmed heads free from other diseases usually show only slight infections at the edges of outer leaves or broken midribs when shipped under good refrigeration. Serious losses occur in shipments affected by tip-burn or other diseases, and in lots not properly refrigerated. Dry-package shipments (without the usual crushed ice between layers of heads in the crate) have been observed to develop more decay and become more discolored and withered than wet package shipments. With crushed ice over the load and crushed ice within the packages the temperature of the lettuce throughout the load averages between 32° and 34°F. Without ice in the packages the few cars on which temperature data are available generally ranged between 34° and 39° F.

Tip-burn (physiological) causes a great deal of loss in California, Colorado, and Arizona lettuce. In some lots 80% of the heads are sometimes affected. Slight discoloration of the tips of the innermost leaves may cause little loss in preparation for the table, but large lesions on the outer head leaves make excessive trimming necessary and are also very subject to bacterial soft rot infection.

Downy mildew (Bremia lactucae) is seldom seen on the market because most of the outer wrapper leaves that show infection are trimmed off before shipment. In one car of California stock inspected in May 1941, downy mildew affected 2 to 4 outer head leaves in 7% of the load. Bacterial soft rot following this disease usually causes more trouble on the market than the original downy mildew infections.

ONIONS:

Bacterial soft rot (Bacterium sp.) was found causing most decay in Texas and California stock shipped in May and June in both 1940 and 1941. Some lots showed more than 50% of the bulbs infected, but the average for most cars was nearer 15 to 20%.

Fusarium bulb rot (Fusarium sp.) has been particularly evident in May shipments of white onions from Texas during the past 2 years.

Gray mold rot (Botrytis sp.) usually is present to some degree in shipments from all onion-growing regions. Stock received from Iowa, Idaho, Colorado, Wisconsin, and Minnesota during August to November, 1940 and 1941, had 6 to 25% of infected bulbs in many shipments. Texas shipments received in May and June often showed 3 to 10% of this rot.

ORANGES:

Blue mold (Penicillium italicum), in 1940 and 1941, occurred in small amounts in shipments from Florida, Texas and California. The average in a great many instances was between 3 and 5%. In rare cases as much as 20% was found.

Brown rot (Phytophthora citrophthora) affected 2 to 3% of a few lots of California oranges received in February and March 1941.

Skin breakdown (physiological) affected many lots of Florida oranges received in December 1941.

Stem-end rot (Phomopsis citri) occurred in Florida and Texas oranges in 1940 and 1941; 4 to 6% decay was present in many shipments.

PEAS:

Gray mold rot (Botrytis cinerea) was one of the most serious diseases of peas during both 1940 and 1941. Stock from California, Washington, and Idaho showed a range of from 3 to 50%. The most extensive decay of peas thus far observed on this market was in a car of Washington stock received in July 1940. The decay ranged from 15% in some hampers to 55% in others, with an average of 50%. This car stood on the track for 5 days and was then sent to the reconditioning platform to see what could be salvaged. At that time practically every hamper of peas was completely rotted. Most of the rot was caused by Botrytis, but watery soft rot was also present in appreciable amounts in many hampers.

Mosaic (virus) was present in California and Washington stock during 1940. The distorted poorly filled pods constituted an important defect in several lots.

Pod spot (Mycosphaerella pinodes) occurred in California and Utah peas in 1941. The highest percentage of infection (30%) was in a Utah car marketed in April. Small amounts of pod spot do not greatly influence the market value of the crop, but when there are several spots per pod the appearance of the lot is seriously injured. Fortunately, there is seldom any secondary infection in these spots.

Scab (Cladosporium pisicola) is one of the important blemishes in California and Washington peas, but is of little consequence from other shipping districts.

Watery soft rot (Sclerotinia sclerotiorum) was found affecting 6% of a lot of Virginia peas received in June 1940. Approximately 30% of the decay found in reconditioning the car of Washington stock described under gray mold rot above was watery soft rot. One lot of Idaho peas received in September 1941 had 9% of this decay.

PEACHES:

Black mold rot (Aspergillus sp.) is rare on peaches on this market. Its presence to a slight extent in Colorado fruit marketed in August 1940 is of interest.

Brown rot (Sclerotinia [Monilinia] fructicola) was found in many cars of Georgia peaches inspected during July 1940 when the average infection was 8%; the average for this same period in 1941 was about 12%. This disease, associated with Rhizopus, was found to be more serious in Texas stock marketed in July 1940 than in any previous season. Temperature influence during transit upon the development of these rots is well illustrated by a car in which the 2 bottom layers of baskets showed 2 to 10%, average 4% decay, the middle layer 4 to 16%, average 8%, and the 2 top layers 8 to 50%, average 20%. The temperature of the fruit at the bottom of the load was 44°, that on top 57°, at the time of inspection. Many cars of South Carolina peaches received in August 1940 averaged 10 to 35% loss due to brown rot.

Spray burn is unusual on market peaches; however, a few car lots from Colorado in August and September 1940 showed this trouble. The typical brown, firm, leather-like patches on the shoulder of the fruit constituted a serious blemish.

PEARS:

Blue mold (Penicillium sp.) and gray mold (Botrytis cinerea) were the only rots of any consequence noted in Washington and Oregon fruit during 1940 and 1941. With a few exceptions the percentage of infection was small. The most severe blue mold (6 to 20%, average 13%) was found in a car of Washington stock in March. The most severe gray mold (4 to 12%, average 8%) was found in a lot of Oregon pears in December.

PEPPERS:

Bacterial soft rot (Erwinia carotovora) occurred in peppers from Mexico, Louisiana, Texas, and California. In most instances infection was at the stem and underneath the calyx. The most severely affected lot averaged about 13% loss.

Rhizopus rot (Rhizopus nigricans) was found affecting 7 to 17% of the Florida stock marketed in February 1940. A car of Mexican stock received in March showed 55% of this decay.

Gray mold rot (Botrytis sp.) was present in Mexican and Texas peppers to a slight extent in both 1940 and 1941.

Mosaic (virus) caused distortion and mottling in a car of Florida stock received in December 1940.

PINEAPPLE:

Black rot (Thielaviopsis paradoxa) is the most serious market disease of this crop. Practically all stock from Cuba is received here from April

to June and in a great many instances the decay in 1940 and 1941 ranged from 5 to 25%.

POTATOES:

Bacterial soft rot (Erwinia carotovora) was particularly serious in Florida shipments received during the first week of April 1940. Several car lots averaged nearly 25% soft rot. One of the most seriously affected lots had a range of from 20 to 80%, average 50% decay, mostly in advanced stages. Alabama, Louisiana, and Texas stock received in May generally ranged from 5 to 8%. One car from Alabama averaged 20%. California and Nebraska potatoes received in July usually showed only slight decay when shipped under refrigeration, but cars shipped under ventilation frequently had as much as 25% decay, in both 1940 and 1941.

Fusarium tuber rot (Fusarium sp.) is the most common storage trouble of potatoes and a small amount can usually be found in most shipments. However, out of several hundred cars inspected, the majority showed an average of less than 1%. Most serious decay was found in some Minnesota potatoes marketed in April 1940 in which the average of several cars was between 10 and 15%, mostly the dry-rot stage.

Late blight (Phytophthora infestans). Minnesota and Florida potatoes inspected in January 1940 frequently showed 5 to 10%, but the most serious loss occurred in a car of Virginia potatoes received in July which averaged 40% late blight. In 1941, Florida potatoes shipped during February and March had a range from 3 to 20%, with an average of 12% in many loads. Several cars of California potatoes received in May showed this trouble affecting 3 to 10%. Wisconsin stock during October frequently averaged over 10%.

Nematodes (Heterodera marioni). Deeply penetrating nematodes affected Texas potatoes in March 1941. This was of particular interest because there were no surface eruptions and females were found 1/4 to 1/2 inch within the tuber.

Ring rot (Phytomonas sepedonica) [Corynebacterium sepedonicum] is frequently confused with ordinary soft rot on the market. In the more advanced stages of decay the 2 diseases are usually associated, but clear indications of ring rot infection are occasionally found. During 1940 a few lots of North Dakota, California, and Idaho potatoes showed this rot without much contamination by the soft rot organism.

Sclerotium rot (Sclerotium rolfsii) occurred in Alabama potatoes marketed in May 1941, generally averaging nearly 4% in the cars showing this trouble. Some lots of Louisiana potatoes showed 5% during June; one lot of Arkansas potatoes in July showed 10%.

RUTABAGA:

Gray mold rot (Botrytis sp.) is one of the important decays found in Canadian stock received during the winter and spring. Arrival inspections often show not more than 5% of gray mold rot but stock held in stores for some time may show 25 to 30% loss.

SPINACH:

White rust (Albugo occidentalis) was a serious blemish in Texas stock received during February and March 1941. Some lots showed a range of from 10 to 55% (average 30%) of the leaves badly spotted.

STRAWBERRIES:

Gray mold rot (Botrytis sp.) affected many shipments of strawberries from Florida in 1941. The most extensive decay was found on inspection of a truck shipment after it had been unloaded in a store. This lot showed decay ranging from 10 to 60% (average 35%) mostly gray mold rot; but as usual some Rhizopus was present.

SWEET POTATO:

Blue mold rot (Penicillium sp.) affected practically all of the roots in a lot of Tennessee stock that showed chilling and freezing injury also.

Rhizopus rot (Rhizopus sp.) caused most of the decay in shipments from all regions. In most lots inspected the range of decay was from 3 to 10%.

Sclerotial [charcoal] rot (Sclerotium [Rhizoctonia] bataticola) affected about 85% of the roots in 200 crates of Tennessee stock inspected in September 1941. Diplodia tubericola also was associated with this rot.

TOMATOES:

Alternaria rot (Alternaria sp.) was present to a slight extent in tomatoes from all shipping regions. As usual it was more prominent as stem-end and blossom-end infections and following growth cracking.

Bacterial soft rot (Erwinia sp.) caused most trouble in Cuban tomatoes received in January 1940 when some lots showed up to 35% loss.

Buckeye rot (Phytophthora terrestris) [P. parasitica] was present in June shipments of Texas tomatoes in 1941. In some cars the average was approximately 3%.

Late blight (Phytophthora infestans) was practically unknown in southern Florida tomatoes until potatoes were grown there. In February 1941, up to 18% infection was observed in some cars of tomatoes received from that region. California tomatoes received in November 1941 showed from 5 to 65% in many cars.

Nail head spot (Alternaria tomato). Judging from tomatoes on the market one might think that this disease has entirely disappeared; however, each year a few specimens are generally picked up in Mexican shipments during January.

Phoma destructiva caused severe decay in several cars of Florida tomatoes received during December and January, 1940 and 1941. Several cars showed a range from 8 to 40%, averaging about 22%.

Pleospora rot (Pleospora lycopersici). The most serious damage from this rot was found in a car of Mexican stock received in January 1940, which showed a range of 18 to 88%, with an average of 40%. The fungus was

mostly in the Macrosporium stage and affected the stem end. Several cars of California tomatoes received in October and November, 1940 and 1941, showed 5 to 20% loss due to this trouble.

Virus mottling is found each year in California tomatoes harvested during late fall. One or two lots of tomatoes received in November and December 1940 were of special interest because 10% of the fruit was affected by the blister stage (hyperplasia) of mosaic. The white waxy superficial irregularities on the surface of the fruit caused some inspectors to believe that the tomatoes had been heavily coated with wax. Florida stock during January 1941 also began to show definite virus mottling. This trouble had not been of any importance in Florida tomatoes previously.

WATERMELON:

Anthracnose (Colletotrichum lagenarium), on market melons, is usually more of a blemish than a decay, but in some instances the lesions penetrate the rind and cause serious damage. Several shipments of Oklahoma melons received in August 1940 averaged from 10 to 16% of serious blemishes and decay.

Stem-end rot (Diplodia sp.) is now well controlled and the serious losses incurred on the market some years ago are rare. The most serious loss of this kind noted in recent years was in a car of Georgia melons received in August 1940, in which 40% of the melons were decaying. In 1941, a slight amount of stem-end rot was found in a few lots of Texas and Missouri melons during July and August.

(DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES).

A SINGLE-VIRUS STREAK DISEASE OF GREENHOUSE TOMATOES IN ILLINOIS

M. B. Linn and H. W. Anderson

On May 4, 1942, 2 tomato plants with symptoms of a virus disease were sent to the writers from a greenhouse operator near Kankakee, Illinois. Approximately 90% of the plants in the houses were said to have been affected. Symptoms observed on these plants were faint, necrotic streaks on the upper stems, petioles, and leaf veins, associated with a yellowing or bleaching mosaic pattern. The latter was the most pronounced symptom of all.

During the first week of September we had another report from this grower to the effect that the disease was starting to reappear in his fall crop, despite the fact that he had steam-sterilized the soil and had not grown any other plants in the houses between tomato crops. When the disease was observed the second time, he immediately rogued out the diseased plants, using extreme care to avoid contaminating the other plants. According to latest advices, practically all of the plants in his fall planting are affected with this disease.

Recently Samson (PDR 26:361) has described a single-virus streak strain of the tobacco-mosaic virus in greenhouse tomatoes in Indiana. The

Table 1. Symptoms caused by the tobacco-mosaic virus, typical strain, and the tobacco mosaic virus, single-virus streak strain, on various plants.

Plants inoculated	Height of plants at time of inoculation	No. of plants inoculated[a/]	Tobacco mosaic virus	
			Typical strain	Single-virus streak strain
Tomato	6"	5	Light and dark green mottling of leaves	Yellow-mottling and bleaching of leaves
Eggplant (Black Beauty)	4"	5	Necrotic lesions on petioles and stems (all plants survived)	Necrotic lesions on petioles and stems (all plants died within 10 days)
Jimson weed	12"	2	Large, tan necrotic lesions	Large, tan necrotic lesions
Nicotiana tabacum	8"	3	Typical mottling of younger leaves	Numerous ring-spot-like lesions on inoculated leaves with mottling of younger leaves
Nicotiana glutinosa	3"	2	Local, tan necrotic lesions	Local, tan necrotic lesions
Nicotiana langsdorfii	3"	2	Local, tan necrotic lesions	Local, tan necrotic lesions tending to spread down midrib
Nicotiana sylvestris	3"	2	Chlorotic primary lesions followed by mottling of younger leaves	Mottling of younger leaves with development of numerous spreading ring-spot-like lesions

a/ Infection was obtained on all plants inoculated.

symptoms he gives and those on the plants we saw are very similar, with the exception that neither we nor the grower could find any symptoms on the fruits.

Shortly after the affected plants were received in May, preliminary experiments were conducted in the greenhouse to determine the identity of the virus. Extracted juice was diluted 1:1 with sterile water and treated for 10 minutes at various carefully-controlled temperatures, ranging at 10-degree intervals from 45° C. to 85° C. Two young tomato plants were inoculated with juice treated at each temperature. In addition, 6 plants were inoculated with the untreated juice and 2 plants with sterile water as controls. All plants, with the exception of the controls, developed yellow mottling within 10 days, indicating that the virus was not inactivated at 85° C. for 10 minutes. No appreciable differences in symptoms were noted among plants inoculated with the heat-treated extract and those inoculated with the untreated extract.

Another experiment was run in which one series of plants was inoculated with untreated juice from the original specimens and another series with juice from tomato plants infected with the common tobacco-mosaic virus, typical strain. The results are shown in the Table 1.

The infected tomato plants from this series (single-virus streak strain) were transplanted to the field on August 21, 3 weeks after appearance of yellow mottling, where they later set fruit. Necrotic streaking appeared in 2 or 3 weeks on the leaves and stems. The fruits remained normal in appearance, although yellow mottling and streaking of the leaves persisted until the plants were killed by frost.

It is not apparent at the present time whether the virus strain we found is the same as that reported by Samson. Had we made additional cross-transfers and had we had more abundant material with which to work, better comparisons of the 2 diseases probably could have been made.

We have no records to show that this particular disease has occurred in other greenhouses in the state; however, as Samson has pointed out for the disease in Indiana, it evidently is highly infectious and capable of causing severe losses once it becomes established in a tomato greenhouse. For that reason we are warning Illinois growers to take unusual precautions to avoid the introduction of any and all strains of the tobacco mosaic virus into their greenhouses.

(DEPARTMENT OF HORTICULTURE, UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS.)

A LATENT VIROSIS ON LOMBARD PLUM IN NEW YORK

E. M. Hildebrand

A masked or latent virus disease of Lombard plum has been found in Niagara County, New York in an Italian prune orchard containing 2 Lombard plum trees. Since this orchard had been previously affected with prune dwarf virosis it was under close observation to check on the rate of spread of that trouble. Following the removal of all trees affected with prune dwarf in 1938, an interval of 5 years passed before the reappearance

of the disease which on this occasion also attacked one of the Lombard trees.

Assuming the symptomless tree to be healthy, specimens were taken from both the diseased and healthy Lombard trees for indexing on this and 3 other plum varieties -- Italian prune, Bradshaw plum, and Damson plum -- with interesting results. Prune dwarf symptoms developed on Italian prune and Lombard plum, as was to be expected. The Bradshaw and Damson plums remained symptomless because of their resistance.1/

The presumably healthy Lombard tree, however, was not healthy since, following the use of grafts from this tree, severe necrotic spotting developed on the foliage of Italian prune and a milder condition on Bradshaw plum. The Damson and Lombard trees remained apparently symptomless.

The discovery that the apparently healthy Lombard plum tree was carrying a latent virus, judging by the striking symptoms produced on Italian prune, is of further interest because a latent virosis on Lombard plum has also been reported by Willison from Canada2/.

At the present time the Lombard variety of plum has all but disappeared from culture in New York State. It is interesting to speculate on how widespread this disease may prove to be in the Lombard variety wherever grown and what part it may have played in the removal of this variety from culture.

(NEW YORK STATE COLLEGE OF AGRICULTURE).

PREVALENCE OF HELMINTHOSPORIUM LEAF SPOT OF OATS IN ARKANSAS IN 1942

H. R. Rosen

Leaf spot of oats caused by Helminthosporium avenae Eidam (perfect stage Pyrenophora avenae Ito), was very common on oats in Arkansas during 1942. While this disease has been noted each year during the past 9 or 10 years, and the pathogen was isolated in 1941 in pure cultures at this Station by L. M. Westman, this is the first year that sufficient attention was given to it to mark it as a disease of major importance.

In an 1800-mile survey covering all of the important oat-growing counties in Arkansas, conducted during May and June, 1942, the disease was found in all of the counties surveyed (some 50 in number), although varying considerably in prevalence.

As a whole it was much more prevalent in the northern part of the State, but it is not entirely clear whether this is associated with differences in varieties grown or with differences in climatic conditions. However, varieties in the Red Rustproof group, grown mostly in the central and southern parts of Arkansas, in general showed less leaf spot than other varieties, although none was noted as being completely free.

1/ Hildebrand, E. M. Prune dwarf. Phytopath. 32:741-751. 1942.

2/ Willison, R. S. Lombard plum latent virosis. p. 73. In Hildebrand, E. M., Berkeley, G. H., and Cation, D. Handbook of virus diseases of stone fruits in North America. Michigan Agr. Exp. Sta. Misc. Publ. 1-76. 1942.

There appears to be no correlation between crown-rust resistance and spot resistance, many varieties resistant to the former disease being highly susceptible to the latter, including Bond, Victoria, Mutica Ukraina, and their hybrids. On Bond growing at the University farm, Fayetteville, it was difficult to find a leaf more than 2 weeks old that did not show 70 to 90% of the leaf area killed by Helminthosporium on June 16, when this variety was in the early milk stage. Nevertheless, some selections from Bond crosses showed as much freedom from spot as the Red Rustproofs. These, however, were exceptions and their seeming resistance or escaping ability may be entirely fortuitous. Most Victoria and Mutica Ukraina crosses were as susceptible as those of Bond.

Much more evidence is needed to prove that Victoria and Bond derivatives are more susceptible as a whole than Red Rustproof varieties, but there were pretty good indications that this was true in Arkansas in 1942. This leads to the suggested possibility that with the introduction of new crown-rust resistant varieties we may run into more difficulty with Helminthosporium leaf spot than has been the case in the past.

The following are characteristic symptoms: Dark brown streaks, often not more than a mm. or less in width and several to many mm. in length, occasionally oval or oblong spots (rarely blotches with ill-defined margins) with darker margins and lighter, sunken, dead centers; mostly on blades and sheaths but also on flowering glumes and on kernels; conidia ordinarily not abundant; in the greenhouse the disease, unless kept going by artificial means, seldom spreads after its first introduction because of paucity of conidial production.

There is some evidence that poor stands and low viability of oats experienced in the current fall seedings are in part at least due to Helminthosporium. Paul H. Millar, Chief Inspector of the Arkansas State Plant Board, reports that oats "which usually germinate well have in several recent cases been found wanting when put to a test". He found germination to be as low as 55% in these cases. Likewise, several standard commercial oat varieties and a number of new crown-rust resistant varieties have given poor stands this fall at the University farm. The lowest stand was noted in Hairy Culberson, with an estimated 5% in 4 replicated 1/50-acre drill plots. Others with poor stands in the same plots were: Forkedeer (Tennessee-092) 25%, Fulwin 35%, Fulghum-2500 25%, Lenoir 25%, Arkansas-20 (selection from Winter Turf) 40%, Fulgrain-4 50%, Victorgrain 50%, and Letoria 75%. These estimated percentages of stand compared as follows with others showing good stands: Lee 90%, DeSoto 85%, and Stanton 85%.

The evidence that poor stands were partly due to Helminthosporium came from the fact that there was much discoloration of glumes and of kernels, the latter being observed when the oats were hulled, plus the fact that from such discolored seed, which had failed to germinate, mycelium and spores typical of H. avenae were obtained. Since the number of samples examined was small, there is insufficient data at present to warrant saying how much of the poor stands was due to Helminthosporium. Incidentally, Greaney and Machacek (Sci. Agr. 22:419-437. 1942) recently reported that H. avenae was one of the fungi frequently isolated from oat seed grown in Canada and that such seed gave rise to diseased plants.

An excellent list of references on Helminthosporium leaf spot is given by Drechsler (Journ. Agr. Res. 24:641-740, 1923) as well as a thorough discussion of the taxonomy of the pathogen. Dickson (Outline of Diseases of Cereal and Forage Crop Plants, etc., 1939) brings the reference list up to more recent date under the heading of "Helminthosporium Leaf Blotch of Oats" p. 61.
(UNIVERSITY OF ARKANSAS, DEPARTMENT OF PLANT PATHOLOGY).

CORN LEAF BLIGHT VERY SEVERE IN VIRGINIA

S. B. Fenne

During the past season numerous specimens of blighted corn leaves were sent in by farmers and many more requests for information were received. In practically every case the damage to the corn leaves was caused by Helminthosporium turcicum, the fungus that causes the disease commonly known as "stripe". The most severe damage occurred in northern Virginia where the yield in some fields was greatly reduced; perhaps as much as 30%. Considerable damage from stripe also occurred in the Southwest, and in the Valley of Virginia. Very little injury was observed in the eastern part of the State. Because of the premature killing and drying of the leaves, farmers were forced to cut corn 2 to 3 weeks earlier than usual in that area. Growers reported greater damage to certain hybrids, especially the short season ones. Those reported as being most susceptible were Pioneer 300, De Kalb and De Kalb 816, Funks G-94, and U. S. 13. There were several other Pioneer hybrids severely damaged and even Reid's Yellow Dent was damaged considerably in many cases. The more resistant hybrids were reported to be Funks 135, Illinois 448, U. S. 99 and U. S. 109, Tenn. 15, and Ky. 201.

There have been many newspaper reports of bacterial wilt of corn, Aplanobacter [Phytomonas] stewarti, causing severe damage to corn, in Virginia, this year. However, I did not observe a single case that I could definitely diagnose as bacterial wilt. It might have been that bacterial wilt appeared early in the season and was followed later by stripe which obscured the wilt symptoms. Dr. Charlotte Elliott has reported several cases of bacterial wilt in northern Virginia, Maryland, and Pennsylvania, but she agrees that stripe was much more prevalent.

The past season has been most unusual. In northern Virginia and in some other parts of the State it rained almost continuously for approximately 6 weeks during the latter part of the season, providing ideal conditions for leaf blighting organisms. It appears that some farmers may be unduly alarmed regarding certain hybrids, which in a normal season do very well. However, it appears that more care should be exercised by corn breeders in the selection of hybrids that are resistant to stripe.
(EXTENSION PLANT PATHOLOGIST).

FUSARIUM EAR ROT IN SWEET CORN

P. E. Hoppe

A most interesting epidemic of Fusarium ear rot, (Gibberella fujikuroi (Saw.) Wr. (Fusarium moniliforme Sheld.)) was observed on September 16 near Lodi, Wisconsin in an 8-acre field of Golden Cross Bantam sweet corn. The field had been planted in June on a low but rich piece of land. The field had been unusually wet throughout the entire season, having been flooded several times during the summer and kept wet by frequent rains up to the time the corn reached the canning stage. The crop, nevertheless, was well grown and except for the ear rot, would have been considered an excellent field of sweet corn.

Examination of the diseased ears showed that infections had developed in wounds following very extensive pericarp cracking. Disease spread rapidly from the numerous local infections with the result that most of the ears had from one to several moldy blotches an inch or more in diameter by the time the corn was ready for canning. Some of the ears were entirely covered with mold. Needless to say, the entire field was rejected by the canners and the crop was cut for silage.

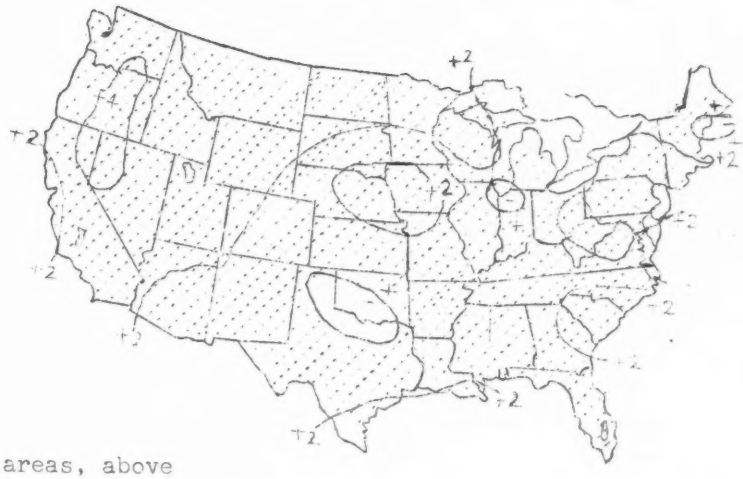
(IN COOPERATION WITH THE WISCONSIN AGRICULTURAL EXPERIMENT STATION, AND THE DIVISION OF CEREAL CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, U. S. DEPARTMENT OF AGRICULTURE).

OCTOBER WEATHER

(From U. S. Department of Commerce, Weekly Weather and Crop Bulletin for week ending November 3, 1942).

Temperature conditions for October, as a whole, in relation to normal, were uniformly somewhat above normal in nearly all sections of the country. Figure 1 shows that they averaged 2° or 3° above normal in the Atlantic area, also along the Gulf coast and in central-northern sections; the plus anomalies were slightly greater in much of the far West and Northwest. Only a very few stations reported deficiencies and these were only 1° or 2°.

While the October temperatures were characterized by geographic uniformity, rainfall was outstandingly spotted, ranging from far below normal in some areas to excessive amounts in others. Figure 2 shows that the monthly totals were extremely heavy in the middle Atlantic area, ranging up to more than twice the normal, and also in a belt extending from central Kansas northwestward to Wyoming where similar abnormalities occurred. On the other hand, rainfall was scanty in much of the South, especially Florida and southern Texas, and it was below normal in the Ohio Valley and most of the central and northern Plains. The monthly contrasts are emphasized by the record for Cheyenne, Wyo., where nearly four times the normal occurred, in comparison with nearby North Platte, Nebr., with 1 percent of normal.



Shaded areas, above normal.

Shaded areas, above normal.

Fig. 1. (Top). -- Departure of Mean Temperature from the Normal for October 1942

Fig. 2. (Bottom). -- Percentage of Normal Precipitation for October 1942

CHECK LIST REVISION

Freeman Weiss

TURNERA (TURNERACEAE)

TURNERA ULMIFOLIA L. Tree of tropical America.

Cercospora turnerae Ell. & Ev., leaf spot. P. R.

TURPINIA (STAPHYLEACEAE)

TURPINIA PANICULATA Vent. Tree of West Indies and Mexico.

Meliola guignardi Gaill., black mildew. P. R.

ULMUS (ULMACEAE)

ULMUS ALATA Michx., under U. THOMASI

ULMUS AMERICANA L., AMERICAN ELM. Tree of Growth Regions 15 to 30 incl. (except 17 and 24); widely grown for shade and especially as a street tree from New England to the Gulf States and Great Plains.

Aleurodiscus griseo-canus (Bres.) Höhn. & Litsch. and A. oakesii (Berk. & Curt.) Cke., on bark of trunks and branches. Iowa, Mo., N. Y.

Aphelenchoides fragariae (Ritzema-Bos) Christie, on cankered twig. N. J.

Apioporthe apiospora (Ell. & Holw.) Wehmeyer, twig canker. Iowa.

Botryodiplodia hypodermia (Sacc.) Petr. and B. ulmicola (Ell. & Ev.) Buisman. See Sphaeropsis ulmicola.

Camarops microspora (Karst.) Shear, on branches. Alaska, Idaho, N. Y.

Carpenterella molinae Tehon & Harris, inhabiting xylem tissues. Wis.

Cephalosporium sp., wilt. See Dothiorella ulmi.

Ceratostomella ulmi Buisman (Graphium ulmi Schwarz), Dutch elm disease*, Ceratostomella wilt. Extensive in northern N. J. and southeastern N. Y. and adjoining parts of Conn. and Pa.; localized in Ind., Md., Mass., Va., W. Va.

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* The term Dutch elm disease is entrenched in American usage but has a number of serious disadvantages, in particular the erroneous imputation that it originated in the Netherlands or owes its introduction into the U. S. to that country. Nor can it be justified on the ground that it is characteristic of the Dutch elm (Ulmus hollandica). Its non-descriptive character and the fact that current phytopathological indexes (Review of Applied Mycology and Biological Abstracts) avoid it are further points in

ULMUS AMERICANA cont.

Cercospora sphaeriaeformis Cke., leaf spot. La., Texas.

Collybia velutipes Fr., brown heart rot, wound rot. Widespread.

Coniothyrium spp., twig canker, dieback. Ill., Mass., Mich., Wis.

C. radicicola Tehon, in moribund roots. Ohio.

Corticium solani (Prill. & Del.) Bourd. & Galzin, damping off. Cosmopolitan, reported especially in nurseries in the Great Plains States.

Coryneum tumoricola Pk., leaf spot. N. Y.

Cylindrosporium ulmicolum Ell. & Ev. Conidial stage of Mycosphaerella ulmi?

Cytospora spp. (probably mostly ambiens Sacc. = Valsa ambiens Pers. ex Fr.), on dead twigs; secondary in various forms of dieback. Widespread.

C. carbonacea Fr. Conidial stage of Cryptosporella hypodermia. Mass., Texas.

C. chrysosperma Pers. ex Fr. = Valsa sordida Nits. Minn.

Cytosporina ludibunda Sacc., twig canker. Ill., Kans.

Daedalea confragosa Bolt. ex Fr., white mottled rot. Widespread.

D. unicolor Bull. ex Fr., butt rot, trunk canker. N. Y., Vt.

Daldinia concentrica (Bolt. ex Fr.) Ces. & De Not., wood rot. Widespread.

Diaporthe eres Nits. (D. ulmicola Ell. & Ev.), on branches. Mich. Also reported in the conidial stage as Phomopsis (Phoma) oblonga (Desm.) Höhn.

Diplodia spp., on dead twigs. In part D. ulmi Dearn., on twig cankers in Ill.; and also Botryodiplodia ulmicola (Ell. & Ev.) Buisman, for which see Sphaeropsis ulmicola.

(Dothidella ulmea (Schw.) Ell. & Ev.): Gnomonia ulmea.

Reports received under the name D. ulmi (Duv.) Wint. probably refer to this rather than to Systremma ulmi (Schleich.) Theiss. & Syd., of which it is a synonym, and this fungus is not known to occur in our range.

Dothiorella ulmi Verrall & May (Cephalosporium sp.), dieback, wilt. Reported from Conn. to Va., Okla. & Mont.; probably general throughout range of host.

Endothia gyrosa Schw. ex Fr., on branches & exposed roots. Ga.

Eutypella spp. (E. scoparia (Schw.) Ell. & Ev., E. stellulata (Fr.) Sacc., E. tumida (Ell. & Ev.) Wehmeyer), on dead branches. Ill., Ga., Md., Mo., N. Y.

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* Cont. -- its disfavor. In the interests of rational nomenclature, such terms should disappear, but this reform can only be accomplished by the introduction and consistent use of names free from these objections. The name Ceratostomella wilt is therefore proposed for the disease caused by C. ulmi, to distinguish it from Dothiorella (Cephalosporium) wilt caused by D. ulmi, and Verticillium wilt, caused by V. albo-atrum, all of which diseases have nearly identical symptoms. They could be called dieback with equal cogency since drooping or flaccidity are not characteristic of the plant as a whole.

ULMUS AMERICANA cont.

Fomes applanatus (Pers. ex Fr.) Gill., white mottled butt rot. Me., Mich., N. Y., Ohio.

F. connatus (Wein. ex Fr.) Gill., white spongy rot. N.E. States.

F. igniarius (L. ex Fr.) Kickx, white spongy heart rot. New England, Wis.

Fomes spp. Additional spp. reported on Ulmus include F. fraxineus (Bull. ex Fr.) Cke.; F. fraxinophilus (Pk.) Sacc.; F. geotropus Cke. (? F. ulmarius Sow. ex Fr.), Fla. to La. & Ark.; F. marmoratus (Berk. & Curt.) Cke., Texas; F. scutellatus Schw. ex Cke., Va.

Fusarium spp., on bark or in wood of blighted twigs. Conn., Ill., Mass. Spp. reported include F. oxysporum Schlecht., F. scirpi Lamb. & Fautr. var. compactum Wr.

Ganoderma curtisii (Berk.) Murr. and G. sessile Murr., white spongy heart and sapwood rot. N. Y., Ohio.

Gloeosporium inconspicuum Cav., leaf spot, twig blight. Mass. to Va., Okla. & Minn. The name anthracnose has been applied to this leaf spot and also those caused by the two following fungi. Since the Gnomonia spot is more generally called black spot, and that caused by G. ulmicolum is a different type of spot, the term anthracnose if used at all should preferably be restricted to G. inconspicuum.

G. ulmeum Miles. Conidial stage of Gnomonia ulmea.

G. ulmicolum Miles, leaf spot. Conn., Ill., Ind., Wis.

Gnomonia ulmea (Schw. ex Fr.) Thüm. (Gloeosporium ulmeum Miles), black spot. General.

Graphium ulmi Schwarz. Conidial stage of Ceratostomella ulmi.

Helicobasidium purpureum (Pat.) Tul., root rot. Texas.

Heterodera marioni (Cornu) Goodey, root knot. Okla., Texas.

Lenzites betulina L. ex Fr., wood rot. Ind., Md., Mass.

Macrophoma ulmicola Ell. & Ev. See Sphaeropsis ulmicola Ell. & Ev.

Marasmius spp., on outer bark of living trees. Occasional.

Melanconis sudans (Berk. & Curt.) Wehmeyer, on branches. Mich., Pa.

Melasmia ulmicola Berk. & Curt., on leaves. N. J. Said to be the conidial stage of Rhytisma ulmi Fr., which was apparently applied to a sterile leaf spot.

Microsphaera alni DC. ex Wint., powdery mildew. Ill., Iowa, Miss., Chic.

Mycosphaerella ulmi Kleb. (Phleospora ulmi (Fr.) Wallr.), leaf spot. Mass. to Ala., Kans. & Wis. Chiefly on U. campestris.

(Lyxosporium hypodermium Sacc.): Sphaeropsis ulmicola.

Nectria coccinea Pers. ex Fr., branch & trunk canker. Mass., N. J., N. Y.

N. cinnabarina Tode ex Fr., on twigs, coral spot. Widespread.

Nummularia clypeus (Schw.) Cke., and N. repanda (Fr.) Nits., on branches. Ind., Kans., Mo., Nebr.

Phleospora ulmi (Fr.) Wallr. Conidial stage of Mycosphaerella ulmi.

Phoma sp., twig canker. Ill.

P. cincta Berk. & Curt., on leaves. S. Car.

ULMUS AMERICANA cont.

Phomopsis sp. (? P. oblonga (Desm.) Höhn.), twig canker, dieback. N.E. States to S. Car., Ill. & Minn. Conidial stage of Diaporthe eres ?

Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind., Texas.

Phyllactinia corylea Pers. ex Karst., powdery mildew. N. Car. to Texas and Iowa.

Phyllosticta confertissima Ell. & Ev., leaf spot. Pa.

P. erratica Ell. & Ev. Ala., Texas.

P. melaleuca Ell. & Ev. Mass. to Ala., Okla. & Wis. Reported sometimes as P. ulmicola Sacc.

Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

Physalospora fusca N. E. Stevens, on branches. Ala.

P. obtusa (Schw.) Cke. Conn., Ga., Kans.

Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. R. I.?

Pleurotus ostreatus Jacq. ex Fr., white sapwood rot, wound rot. Widespread.

P. ulmarius Bull. ex Fr., brown ring rot, wound rot. Widespread.

Polyporus spp., wood rot chiefly of dead trunks & logs, sometimes heart rot of living trees, especially:

P. admirabilis Pk., N. Y.

P. adustus Willd. ex Fr., white mottled heart rot. Ind., N. Y., Va., Wis.

P. conchifer (Schw.) Fr., on dead twigs and branches. Widespread.

P. delectans Pk., N. Y.

P. dryadeus Pers. ex Fr., N. Y.

P. fragrans Pk., Ind., Ohio.

P. frondosus Dicks. ex Fr., Conn., Ohio.

P. fumosus Pers. ex Fr., Mass., N. Y., Wis.

P. galactinus Berk., Me., N. Y.

P. gilvus (Schw.) Fr., N. Y., Wis.

P. hirsutus Wulf. ex Fr., Mo., N. Y.

P. lacteus Fr., N. Y.

P. resinosus Schrad. ex Fr., Me., Va.

P. spumeus Sow. ex Fr., white sapwood rot, wound rot. N. Y., Ohio.

P. squamosus Huds. ex Fr., white spongy heart rot. N.E. and N. Central States.

P. sulphureus Bull. ex Fr.

P. tulipiferus (Schw.) Overh., N. Y.

P. unitus Pers., Mich.

P. versicolor L. ex Fr., N. Y. Associated with "dote", a brown pocket discoloration or decay of timber.

Prosthecium ulmi Wehmeyer, on branches. Mich.

(Rhizoctonia crocorum Pers. ex DC.): Helicobasidium purpureum.

(R. solani Kühn): Corticium solani.

Rhytisma ulmi Fr. Reported from Minn., N. J., Pa.; all apparently based on sterile material or confused with Gnomonia ulmea.

Sacidium ulmi-gallae Kell. & Swingle, on leaf galls. Kans., Texas, Wis.

ULMUS AMERICANA cont.

Schizophyllum commune Fr., wood rot. Cosmopolitan.
Septobasidium pseudopedicellatum Burt, brown felt. N. Car.
Septogloeum parasiticum Kauffm. & Dearn., twig blight. Mich.
(S. ulmi Briosi & Cav.): Mycosphaerella ulmi.
S. profusum (Ell. & Ev.) Sacc., leaf spot. Ill., Miss.
Sphaeropsis sp., especially S. ulmicola Ell. & Ev., twig canker, dieback. Conn. to Miss. & Wis. (This has been called Botryodiplodia hypodermia (Sacc.) Petr. (1923) and B. ulmicola (Ell. & Ev.) Buisman 1931; Macrophoma ulmicola Ell. & Ev. is also a synonym. If it is correctly placed in Sphaeropsis and the American and European forms are the same, the proper combination is S. hypodermia (Sacc.) Höhn. No ascigerous stage is known).
(S. ulmea Ell. & Barth.): Physalospora obtusa.
Stereum spp., wood rot. Spp. reported include S. cinerascens (Schw.) Massee, S. fasciatum Schw., S. purpureum Pers. ex Fr., S. subpileatum Berk. & Curt.
Taphrina ulmi (Fckl.) Johans., leaf blister. Conn. to Miss., Mo. & Wis.
Thyronectria chlorinella (Cke.) Seeler, Ala., N. Car.
T. chrysogramma Ell. & Ev., Kans.
Uncinula macrospora Pk., powdery mildew. General.
Ustulina vulgaris Tul., white sapwood rot. Md.
Valsa ambiens Pers. ex Fr., on dead twigs. Widespread.
Verticillium sp. (? V. albo-atrum Reinke & Berth.), wilt, dieback. Me. to Va. and Wis.; Oregon.
V. rhizophagum Tehon, on roots. Ohio. (Probably secondary, on trees injured by phloem necrosis).
Xylaria spp. (X. hypoxylon L. ex Grev., X. mali Fromme, X. polymorpha Pers. ex Grev.), root rot (secondary). Ill., Miss., Va.
Mosaic (infectious chlorosis, mottle-leaf), probable virus. Ohio; other reports based on similarity of symptoms from Conn. to Va. and Iowa.
Phloem necrosis, virus. Ill., Ind., Ky., Mo., Ohio, Tenn., W. Va.
Slime flux, physiological -- associated with wet soil, mechanical injuries to roots, collar and crotches, and to frost cracks; frequent on lawn and street trees.

(ULMUS CAMPESTRIS): U. PROCERA

ULMUS CARPINIFOLIA, under U. PROCERA

ULMUS CRASSIFOLIA Nutt., CEDAR ELM. Trees, sometimes shrubby, of Growth Regions 17, 20, 29, 30; wood used commercially and cult. for shade, Zone VII.

Cylindrosporium tenuisporum Heald & Wolf, leaf spot. Texas.
Diplodia sp. (D. ulmi Dearn. ?), on twigs. Texas.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. La., Miss., Texas.

ULMUS CRASSIFOLIA cont.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Septobasidium sydowii Couch, brown felt. Texas.
Uncinula macrospora Pk., powdery mildew. Texas.

ULMUS FULVA Michx., SLIPPERY ELM. Tree of Growth Regions 15 to 30 incl. except 17, 27 & 28, wood used commercially.

Ceratophorum ulmicolum Ell. & Kell., leaf spot. Kans., Nebr.
Ceratostomella ulmi Buisman, Dutch elm disease. Ind., N. Y., Ohio.
Dothiorella ulmi Verrall & May, dieback, wilt. Conn. to Va. & Okla.
Eutypella spp. (E. fraxinicola (Cke. & Pk.) Sacc., E. scoparia (Schw.) Ell. & Ev.), on dead branches. Ga., Ind.
Fomes connatus (Weinm. ex Fr.) Gill., white spongy rot. Conn., Mass.
F. everhartii (Ell. & Gall.) Schrenk. W. Va.
Gloeodes pomigena (Schw.) Colby, on twigs. Ind.
Gloeosporium ulmicolum Miles, leaf spot. N. Y.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. Widespread.
Lycosphaerella ulmi Kleb., leaf spot. N. Y. to N. Car., Kans. & Wis.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Mo.
Nummularia repanda (Fr.) Nits., on branches. Del.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind.
Phyllosticta confertissima Ell. & Ev., leaf spot. Kans.
P. erratica Ell. & Ev., Ala.
P. melaleuca Ell. & Ev., Ind., Mich., W. Va.
Physalospora obtusa (Schw.) Cke., on branches. Ga.
Prosthecium (Pseudovalsa) ulmi Wehmeyer, on twigs. Iowa.
Sacidium ulmi-gallae Kell. & Swingle, on leaf galls. Wis.
Taphrina ulmi (Fckl.) Johans., leaf blister. Va.
Uncinula macrospora Pk., powdery mildew. Va. to Ind. & Mo.
Verticillium albo-atrum Reinke & Berth., wilt. Pa., Wis.

ULMUS GLABRA Huds., under U. PROCERA

ULMUS PARVIFOLIA Jacq., under U. PUMILA

ULMUS PROCERA Salisb., ENGLISH ELM. Large tree of England and W. Europe, long cult. for. shade, especially in the N.E. States, occurring in a number of vars. including yellow- and purple-leaved types. Several other European elms as U. CARPINIFOLIA Gleditsch., SMOOTHLEAF E., U. GLABRA Huds., SCOTCH E., and U. HOLLANDICA Mill., DUTCH E. (a group of hybrids between carpinifolia and glabra) are included; cult. for shade, Zones IV-V.

Ceratostomella ulmi Buisman, Dutch elm disease. Conn., N. Y.
Coniothyrium ulmi Tharp, leaf spot. Texas.

ULMUS PROCERA cont.
Gloeosporium inconspicuum Cav., leaf spot. Mass.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. N. J.
Heterodera marioni (Cornu) Goodey, root knot.
Mycosphaerella ulmi Kleb., leaf spot. Conn., N. Y.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Mass., N. J., N. Y.
Phomopsis oblonga (Desm.) Höhn., twig blight. Mass.
Phyllactinia corylea Pers. ex Karst., powdery mildew. N. Car.
Phyllosticta melaleuca Ell. & Ev., leaf spot. Vt.
Sphaeropsis ulmicola Ell. & Ev., twig canker. Pa.
Taphrina ulmi (Fckl.) Johans., leaf blister. Mass., Wis.
Verticillium albo-atrum Reinke & Berth., wilt. Conn., Mass., N. J., N. Y.

ULMUS PUMILA L., SIBERIAN ELM. Tree of E. Siberia and China, cult. for shade, especially as a street tree in dry parts of Zone IV. Including U. PARVIFOLIA Jacq., CHINESE ELM, a small tree of E. Asia, grown for ornament, Zone V.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., branch canker. Ark.
Ceratostomella ulmi Buisman, Dutch elm disease. N. Y.
Chalaropsis thielavioides Peyronel, seedling root rot. N. Dak. to Okla. & Wyo.; N. J., N. Y.
Conicthyrium ulmi Tharp, leaf spot. W. Va.
Cytospora sp. (? C. chrysosperma Pers. ex Fr.), dieback, twig canker. N. Dak. to Texas & Oregon.
Didymosphaeria sp., on twigs. Texas.
Eutypella scoparia (Schw.) Ell. & Ev. and E. stellulata (Fr.) Sacc., on branches. Ala., Ga., La.
Gloeosporium ulmicolum Miles, leaf spot. Conn., Ga., Kans., Tenn., Texas.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. Widespread.
Heterodera marioni (Cornu) Goodey, root knot. Calif., Okla.
Libertella sp., canker. Colo.
Lyxosporium hymenuloides (Sacc.) Höhn., on twigs. Okla.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Widespread.
Phomopsis sp., on twigs, ? canker. Wis.
Phyllosticta sp., leaf spot. N. J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Texas.
Pratylenchus pratensis (De Man) Filip., in roots. Okla.
Pythium spp., damping off. Great Plains States.
Rhizoctonia solani Kühn, damping off. Great Plains States.
Stictidium ulmi-gallae Kell. & Swingle, on leaf galls. Texas.
Schizophyllum commune Fr., wound rot. Calif.
Sphaeropsis ulmicola Ell. & Ev., twig canker. Conn.
Thyrostroma compactum (Sacc.) Höhn., trunk canker. Ill.

ULMUS SEROTINA Sarg., RED ELM. Large tree of Growth Regions 25, 27, 29; cult. for shade, Zone V.

ULMUS SEROTINA cont.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. Miss.
Mycosphaerella sp. (? M. ulmi Kleb.), leaf spot. Ga.

ULMUS THOMASI Sarg. (U. RACEMOSA Thomas), ROCK ELM. Large tree of Growth Regions, 18, 19, 21, 22, 23, 24, 25, 26, 27; wood used commercially. Including U. ALATA Michx., WINGED ELM, similar to preceding but of southern range, sometimes planted as a street tree in the South.

Cylindrosporium tenuisporium Heald & Wolf, leaf spot. Texas.
(C. ulmicolum Ell. & Ev.): ? Mycosphaerella ulmi.
Daedalea confragosa Bolt. ex Fr., white sapwood rot. Tenn.
Fomes igniarius (L. ex Fr.) Kickx, white spongy heart rot. Tenn.
Gnomonia ulmea (Schw. ex Fr.) Thüm., black spot. Ill., Texas, Va.
Monochaetia desmazierii Sacc., leaf spot. Ga.
Mycosphaerella ulmi Kleb., leaf spot. Ill., Miss., N. Car., Texas.
Nummularia clypeus (Schw.) Cke., on branches. Ill.
Phyllactinia corylea Pers. ex Karst., powdery mildew. N. Car. to Texas & Ill. On U. alata.
Phyllosticta melaleuca Ell. & Ev., leaf spot. Miss., Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on branches. Ala.
Septobasidium pseudopedicellatum Burt, brown felt. N. Car.
Septogloeum profusum (Ell. & Ev.) Sacc. (? Mycosphaerella ulmi), leaf spot. Ala.
Uncinula macrospora Pk., powdery mildew. Widespread.

UMBELLULARIA (LAURACEAE)

UMBELLULARIA CALIFORNICA (Hook. & Arn.) Nutt., CALIFORNIA-LAUREL. Evergreen tree or shrub of Growth Regions 1, 4, 5, 10; wood used commercially, grown for ornament. Zone VII.

Anthostomella oreodaphnes (Cke. & Hark.) Berl. & Vogl., on leaves. Calif.
Asterina anomala Cke. & Harkn., black mildew. Calif.
Ceuthospora sp., on leaves. Calif.
Cyclodomus umbellulariae Höhn., on leaves. Calif.
Diplodia harknessii Sacc., on leaves. Calif.
D. umbellulariae Ell. & Ev., on twigs. Calif.
Fomes applanatus (Pers. ex Fr.) Gill., white mottled butt rot. Calif.
F. fomentarius (L. ex Fr.) Kickx and F. igniarius (L. ex Fr.) Kickx, white mottled heart and sapwood rot. Calif.
Gloeosporium allescherianum (P. Henn.) Wr., on leaves. Calif.
Lenzites betulina L. ex Fr., wood rot. Calif.
Leptosphaeria oderae (Cke. & Harkn.) Berl. & Vogl., on branches. Calif.
Mycosphaerella arbuticola (Pk.) House, on leaves. Calif.
Nectria cinnabarina Tode ex Fr. and N. coccinea Pers. ex Fr., canker, dieback. Calif.

UMBELLULARIA CALIFORNICA cont.
Polyporus versicolor L. ex Fr., wood rot. Calif., Oregon.
Poria ambigua Bres. and P. ferruginosa Schrad. ex Fr., wood rot. Calif.
Schizophyllum commune Fr., wood rot. Calif.
Stereum albobadium Schw. ex Fr., wood rot. Calif.
Thyridaria californica Rehm, on branches. Calif.
Valsa americana Berk. & Curt., on branches. Calif.

UNGNADIA (SAPINDACEAE)

UNGNADIA SPECIOSA Endl., MEXICAN-BUCKEYE. Shrub or small tree of Growth Regions 11, 16, 17, 20, 29, 30; sometimes grown for ornament and source of honey.

Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
(DIVISION OF MYCOLOGY AND DISEASE SURVEY).